approach

OCTOBER 1980 THE NAVAL AVIATION SAFETY REVIEW

"Poor lateral and vertical communications within the command contributed to this accident."

THE title phrase, or one very much like it, is becoming all too common in our aircraft accident reports. This type of statement indicates that important safety information within a unit was not known, or was not known by the people in a position to effect a needed change. There is also the possibility that the information was known by the key people, was ignored or minimized, and its knowledge was denied after an accident occurred. This latter possibility may be the case in some accidents, but let's assume for the sake of this discussion that the key players were at least partially ignorant of some critical information affecting safe operations within their unit.

Consider the squadron CO who has always been a strong supporter of the safety program and his safety officer(s). He has tried to demonstrate to his flightcrews the necessary balance between being aggressive, hard charging types and maintaining a good, common-sense approach towards safe operations. This CO has preached safety and has practiced what he preached, but he has a serious problem and doesn't even know it.

He has a bright, young pilot that has excelled in just about everything he has attempted. This lieutenant (junior grade) has done so well in his operational and administrative duties that the CO has come to trust his judgment over many of the more experienced officers in the command. But as good as this lieutenant is, he thinks he's even better. He has demonstrated to various other pilots his apparent disdain for many of the safety regulations and NATOPS procedures in the squadron. A few of his friends feel he's an accident waiting to happen. These peers admire the lieutenant's professional competence; perhaps they're even a little jealous of his success in the squadron.

Now, according to professional ethics and official regulations, these officers should report the few minor incidents of unsafe acts by this lieutenant. They have heard the safety officer's and CO's pitch on "open door" policies concerning important matters such as safety. They also know, however, that they don't have much concrete evidence and that their *gut feelings* concerning the lieutenant may be construed as professional jealousy and end up getting them reputations as "rats." What will they do, what will they do?!

They'll probably do nothing, but they might report these incidents if there were a squadron *Anymouse* program for matters regarding safety. They might pass this critical information along if they didn't feel they had to put their necks and reputations on the line to do so. A squadron *Anymouse* program, with submitted reports going only to the squadron safety officer, XO, and CO, may not be the best possible means of overcoming this "information gap," but without something like it, COs can never realistically expect to get this type of information. Why not take a serious look at your unit and see if there is a viable channel of communications for sensitive safety information? If there's not, your blissful ignorance may jump up and bite you someday soon!

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Mr. R. G. Smith of McDonnell-Douglas Corporation drew the new AV-8B Harriers on this month's cover.

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COLLISION AVOIDANCE

Whose responsibility?

By Eugene A. Homer
APPROACH Writer

AIR Combat Maneuvering (ACM) is well known throughout the entire aviation community as a very demanding phase of flight. For those who don't get to experience the ups, downs, and arounds of simulated aerial combat, it is simply simulated offensive or defensive aerial combat consisting of engagements between aircraft on opposing sides, or practice defensive turns, SAM (surface-to-air-missile) breaks, or other combat avoidance maneuvers by flights of one or more aircraft. But as most know, ACM is not as simple as defined in OPNAVINST 3710.7J. The nature of ACM demands that a pilot be thoroughly familiar with the performance capabilities and limitations of the aircraft being flown (not to mention his own personal characteristics and those of his adversaries). Rapid changes in heading and altitude and the wide range of velocities generated are inherent with ACM. These factors, combined with the necessity of maintaining visual contact with each other during an engagement, require total dedication, discipline, and professionalism throughout the entire spectrum of ACM. Otherwise, the possibilities of midairs increase proportionate to the disregarded safety parameters.

One of the main parameters or ingredients of safe ACM engagements is that a breakaway ("Knock-it-off") will be initiated at minimum weapons range or at a range to pass no closer than 500 feet to the adversary aircraft. When aviators decide to break these and other rules of engagement, disaster usually is around the corner. The story to follow actually happened to a flight of 2 versus 2 that disregarded some of the basic rules of ACM and safe flight in general.

The mission was an ACM training flight involving two F-4Js opposed by two TA-4J adversary aircraft. The pilot of the incident *Phantom* was a seasoned pilot with 10 years of flying experience under his belt. During those 10 years he had accumulated over 2600 hours of flight time, with over 2100 in-type. His RIO was half as experienced, with 1200 total hours and 1000 in-type. They had spent a lot of time yankin' and bankin' in the ACM environment. In the incident *Skyhawk,* the IP had over 3000 total hours, with 700 in *Scooters.* His RIO had over 1300 total hours, but only 50 hours in-type. All, however, were qualified and ready for the flight. The two pilots involved in the midair were considered to be among the best in the *dogfighting* phase of training. But the A-4 jock had one predominant psychological trait that separated the two pilots professionally. He was best described as *excessively motivated by the desire to succeed in competitive situations in the air and on the ground.*

After a very thorough face-to-face brief of SOP and NATOPS, in which the rules of engagement and out-of-control procedures were stressed, the crews departed for the early

afternoon launch. The F-4s were delayed 30 minutes because of a temporarily "down" aircraft, but otherwise the flights departed NAS Fightertown without any major glitches. Radar vectors from the controlling agency were unavailable, as was the F-4's radar, so the two flights switched to a prebriefed UHF frequency for a visual rendezvous. The joinup was expeditious, as was the ensuing breakup. The A-4s headed south, the F-4s north, readying for the 2 versus 2 ACM engagement.

At 30 miles separation, the two flights of two initiated the head-on intercept of each other. The A-4s were at 18,000 feet when they spotted the F-4s at 11 o'clock high, some 4,000 to 5,000 feet above them. Separation at first sighting was 6 to 7 miles. The F-4s picked up the A-4s (one dark A-4, one light A-4) as they passed their 9 o'clock low position at 1 to 2 miles lateral separation. The fight was on!

The lead *Phantom* made a level port turn at 1.1 IMN and saw the two *Skyhawks* across the circle – low, at 3 o'clock. Moments later, *Phantom*-2 called the lead *Skyhawk* at *Phantom*-1's 6 o'clock. *Phantom*-1 then rolled his wings level and extended to the south to gain separation from the pursuing A-4. During his extension, the lead F-4 picked up *Skyhawk*-2 at his wingman's six. Both were low, pulling away from the other two aircraft, and locked in combat. The lead *Phantom* wanted to turn hard and low to pursue his wingman and the "in-position" A-4. Suddenly *Phantom*-1 spotted the other A-4 (lead) at his 11:30 position. The lead A-4 was slightly low at 1½ nm and closing in on him. The pilot of *Phantom*-1 momentarily took his eyes off the closing A-4 and focused on his wingman and the other A-4 across the circle. *Phantom*-1's RIO continued his visual lock on the lead A-4 and noted that it was turning early on them. At about 3,000 feet separation, the A-4 went belly-up to *Phantom*-1, and at less than 1,000 feet, *Skyhawk*-1 was blind to *Phantom*-1. "I think we're going to hit!" exclaimed *Phantom*-1's RIO. They did!

The crash was far more violent than expected and was followed by a loud explosion and fire. The crew of the disintegrating *Phantom* managed to eject themselves from the now-coming-unglued aircraft, but the crew of the disintegrated *Skyhawk* was never heard from or seen again – victims of the inevitable, yet preventable, midair collision that they helped set up.

Although the F-4 ejection proved to be successful, and the crew was picked up within 30 minutes, there were several items of interest in their egress routine. Both the pilot and the RIO of the F-4 utilized the lower ejection handle at about 20,000 feet and 350 KIAS. The pilot noted severe wind blast, but his RIO did not. The RIO felt a painful kick in the buttocks, but the pilot did not. The RIO later stated that he had been 4 to 5 inches off his seat pan upon ejection. The pilot's helmet and mask (USAF type) dislodged slightly, but remained on his head. The RIO could not recollect where or when during the ejection sequence his mask was lost. Descent and chute deployment were as expected, with the exception of moderate to severe turbulence experienced passing 12,000 to 10,000 feet. This and the sensation that their "free-fall" time was exceedingly long had both pilots attempting to use their D-rings to manually open their chutes when automatic actuation occurred.

During descent, both deployed their rafts and LPAs and transmitted Maydays on their PRC-90s. Reception was loud and clear by the orbiting wingmen and nearby helos. Their DWEST training had proven effective. Oscillations during their downward trip were noticeable, especially to the RIO who had deployed his raft too high (12,000 feet). These oscillations dampened when he raised his raft to body level. Entry into the cold Pacific waters was at an acute angle, and both crewmen had to practice what they learned in DWEST to release themselves from their chutes and enter their rafts. Entanglement of appendages and life support equipment was a minor problem to both, but judicious use of knives and shroud cutters was effective. They were ready for helo pickup in short order. Communications were established between the downed crew and helos, and smoke signals ignited by the crew enabled the helos to locate them in the heavy sea state. The downed crewmen, who were well prepared for the worst, were picked up and back on dry land within an hour after the collision. Despite a few minor injuries, the F-4 crew was able to return to flight. This was not true for their adversary A-4 competitors. They and their *Skyhawk* were never to be found, despite extensive SAR efforts to locate signs of possible survival.

The cause of this avoidable and costly accident is relatively easy to explain. It was a result of poor headwork, bad judgment, and unprofessional flying by both incident aircraft. The overaggressive and unsafe flight practices of the "win-at-all-cost" A-4 pilot, coupled with the failure of the F-4 pilot to call off the engagement and try to evade the oncoming "blind" *Skyhawk* brought these two adversaries together. They tried to defy one of the laws of physics – trying to occupy the same space at the same time! They were unsuccessful.

There is no doubt that a point was reached where there was no avenue of escape for either the *Phantom* or the *Skyhawk*. The two capable and knowledgeable pilots knew the rules, knew each others' capabilities and limitations, yet permitted the "battle" to progress beyond the established rules of engagement limits. Neither pilot would swallow his professional pride and initiate the "Knock-it-off!" call, thereby bringing the ringing answer to the article's title – *Avoidance of midair collisions in any flight regime must remain the collective responsibility of all aircrews in the same airspace.*

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Common sense violated

THERE have been numerous incidents recently where common sense has been violated, thereby causing totally preventable injury to personnel and damage to equipment. Some seem to be *Keystone-Koppish,* others are on the more serious side. In the vast majority of cases, the mishap could have and should have been prevented by adherence to common sense. One blatantly foolish case involved an errant B-5 workstand trying to match the hurricane-strength winds generated by a turning KC-130.

The *Hercules'* copilot and flight engineer, along with their first mechanic, manned their aircraft to do a maintenance runup. They called for and received clearance to the duty runway where "normal" runups were conducted (there are no exclusive high-power runup areas at this MCAS). Upon reaching the duty, they were informed that due to conflicting traffic the runup could not be conducted. The crew then asked if the runup could be done on the parallel taxiway. This, too, was denied because of congestion there. Not to be totally thwarted in their endeavors, the crew taxied the C-130 to the far end of the squadron flight line to check the aircraft's synchrophaser. Finally, a spot was found to check the *Hercules.*

The KC-130 was positioned into the wind, which was from 280-330 degrees at 10-15 knots. The copilot and flight engineer were at the controls and the mech was positioned outside and in front of the aircraft as the outside observer. He was in communication with the flight station crew by interphone cord. The four turboprops were turning at ground idle, about to be advanced for the runup, when the outside crewman informed the inside crewman that an individual, *inside* and *underneath* a B-5 workstand, was attempting to push the stand behind the turning C-130. The distance of the individual and his piece of GSE was some 40 feet aft and perpendicular to the aircraft's tail. The flight station crew discussed the situation and decided that it was OK to run the aircraft up to 6,000 in-lbs to check the synchrophaser. No one recalled that, at this power setting, 100 knots of wind would be generated 40 feet behind the C-130. As power was added, the outside observer (mech) tried to wave the "caged" individual away from the danger area.

All efforts were to no avail. As the maintenanceman and his stand entered the propwash area, the blast started to move them (at an ever-increasing rate) aft towards the limits of the flight line – totally uncontrolled! The frantic outside observer notified the copilot to reduce power to ground idle, but the response was too late. The B-5 stand and its "along-for-the-ride" individual traversed the extent of the flight line at a high rate of speed. They exited the concrete portion of the ramp and flipped over on the adjacent grass area, inflicting multiple head traumas and facial lacerations to the individual and causing extensive damage to the B-5 workstand.

While all this was going on, the flight engineer left his flight station and went to the crew entrance door where he received the "cut" signal from another individual. All efforts were too late to prevent the incident. The injured person was administered on-the-spot first aid and taken to the local dispensary where he was further treated and eventually released. The B-5 stand was to be out of service for some time while awaiting parts to get it back in commission.

The flightcrew followed all existing precautions in conducting the synchrophaser check, up to the point of requiring a clear blast area behind the aircraft. They ignored common sense by advancing the power to 6,000 in-lbs. The other error was that the individual with the B-5 workstand also ignored SOP by continuing behind a turning aircraft. If either policy had been adhered to, or had any common sense been used, this incident could have been prevented. From now on (in this squadron, anyway) SOP includes that tow bars will *once again* be put back on GSE and used as designed. Hopefully, this unit's repeated request for an exclusive high-power runup area – complete with blast fence – will be honored in the near future.

"Good old George, I know he hack it..."

By Robert A. Alkov, Ph.D.
Naval Safety Center

CDR Glenn Goodguy hung up the phone, sighed, and walked over to the window. The sky was the color of blue that you see on calendars and a bucolic scene lay in the foreground, but the commander didn't notice. He watched an aircraft lift off the runway and followed it as it disappeared into a horizon dotted by puffy cirrus clouds. *The buck stops here, I guess.* Steam from a cup of coffee rose from his desk and drifted away.

CDR Goodguy's thoughts wandered back to the day, 3 years ago, when LTJG George Fairhair had first reported aboard. *George was a likeable guy. A bit cocky, perhaps, but he could have been a real asset to the squadron.* CDR Goodguy thought that George was definitely flag rank material. George felt the same way, apparently. Anyway, he rapidly qualified as an aircraft commander. *Yes, I thought I was lucky to be getting an officer like that.* George had been the eldest son of a senior naval officer and, from early childhood, had excelled in both athletic and academic endeavors. He had a winning personality and an intense desire to succeed. He had done well at the Naval Academy, especially in sports, and had greased through the Naval Air Training Command. He was highly motivated toward the fighter community, but his wife was against it.

George received orders to a Fleet Replacement Squadron, flying an aircraft that had the reputation of being safe to fly. He couldn't help but feel disappointed, in spite of the fact that he had requested it at his wife's urging. Nevertheless, George soon mastered the syllabus and was sent to his first fleet assignment.

A knock on the door broke through the CO's thoughts. It was the yeoman from the communications shack with a message. The phone rang; LCDR John Eveready, the squadron ASO, was on the line asking the skipper to convene a mishap board. The CO reminded John to call the flight surgeon.

Ignoring his now cold cup of coffee, CDR Goodguy stared at the message that communications had just delivered, confirming the news.

George was a perfectionist, a meticulous flight planner, and knew his NATOPS as well as anyone could. How could this have happened?

George had quickly become a leader among the junior officers and enlisted personnel. He had begun to have occasional confrontations with the more senior officers because of his concern for his followers' welfare. This brought him tremendous loyalty and respect from his peers and subordinates, but isolated him from many of the squadron officers.

CDR Goodguy stared at the calendar on his desk. *It was almost a year ago that George submitted his letter. I should have seen it coming.* George had begun to show signs of frustration with his inability to change things. After all, most of his life he had been a leader and a winner, yet now he could not seem to control events. He finally submitted a letter of resignation from the Navy, to be effective in 1 year. He was planning a career as an airline pilot and had contacted several airlines.

As CO, I was concerned over the loss of such an outstanding officer to the Navy, but I couldn't dissuade him from his decision. The Commander shifted in his chair, took out a personal file from his desk and looked up an address.

George's skill and confidence in the airplane and his ability to fly it had increased. However, he had begun to develop a

can

pattern of performance which, while legal, was certainly not standard. *He was such a good stick that admonishing him on such trivial matters would seem like nit-picking. Anyway, he was already disgusted with "Mickey Mouse" management.*

Six months ago, George was involved in an incident that should have been a clear signal that things were getting out of hand. He buzzed the tower on departure, after a hot, early, gear-up takeoff. *I liked George and thought of him as a son, or at least a kid brother. I called him in and had a heart-to-heart talk with the kid. He was such an exuberant, likeable guy. After all, "Boys will be boys"! I remember some of the things we did when I was that age. We need this kind of aggressive aviator, don't we?*

CDR Goodguy had a strict policy regarding alcohol consumption and flying. He had taken disciplinary action before against anyone who violated the "12-hour, bottle to brief" rule. Off duty, he expected to see his "boys" at happy hour, however. After all, the traditions of Naval Air demand

that an up-and-coming naval officer be convivial and share a cup of cheer with squadronmates at the "O" Club! *George used to be the life of any party, but he started taking his role as president of the Junior Officers' Protective Association too seriously.*

Suddenly the CO felt 10 years older, the weight of the world seemed to rest on his shoulders. *I knew George was developing a "short timer's" attitude when he started missing AOMs and skating out early when he wasn't scheduled, but he could always hack the flying.*

When the request came to send an aircraft for a static display at an airshow near George's hometown, it had seemed natural to send George. His presence was no longer critical to the squadron. *I admonished him not to try to put on his own airshow – just to get the aircraft there and back in one piece.*

George and his crew had arrived at the site of the airshow on Friday night. *They would follow Good Old George into hell itself!* The crew tied down and shoved off, with promises to meet at a favorite pub of George's on Saturday night. George had really enjoyed talking flying with his dad, and later with the old gang down at the "watering hole." He was really in his element there. He had introduced a couple of his crewmembers to the group. Forgetting the time, he downed several gin and tonics and played the hero. Finally, realizing dimly that they were to fly the next day, he had said his farewells as the party broke up around 0200.

The next day, his folks had driven him to the airport, where he met his crew at 0800. George didn't feel all that well. He had gotten only 4 hours sleep and was suffering from a hangover, but he was determined to show the hometown gang what he could do with an airplane.

After a hot takeoff, he sucked up the gear and made a high-performance climbout. Accelerating in a climbing turn, he had done a couple of unauthorized maneuvers, then made a high-speed, low pass. Unfortunately, he was into the trees before his dulled senses had recognized what was happening.

It wouldn't have been so bad, but he took several crewmembers with him. The hometown folks were witnesses to the loss of four lives and a multimillion-dollar piece of taxpayer's property! What an advertisement for Naval Air!

With a heavy sigh, CDR Goodguy turned to put on his cap. He didn't look forward to what he had to do next. Visiting new widows was not his bag, and he had the rounds of several homes to make this day.

I wonder what I could have done to prevent this tragedy. The nagging realization haunted him that he should have and could have taken action when he saw George getting more and more frustrated with "the system." When George put in his letter of resignation, when he was caught violating station departure rules, when the chance came to send him on an unsupervised boondoggle to his hometown in the company of his admirers, when he gave him the opportunity to put on a little airshow for the hometown folks to show off his prowess as an aviator – these were all times when CDR Goodguy could have taken preventative measures.

Others may attempt to sort out the causes, but CDR Goodguy knew in his heart that he was one of the links in a chain of circumstances that could have been broken. He had to live with that.

• Analysis of major aircraft accidents at the Naval Safety Center indicates a higher percentage of pilot error for aviators that had made, or were in the process of making, a decision to leave the service. – Ed.

By CDR R. C. Franz
VA-115

APPROXIMATELY 1 year ago, our squadron developed a "warning" handout sheet for the purpose of disseminating NATOPS warnings to flightcrews. The program met with instant success, and it was quickly discovered that the same format could be used to warn all squadron personnel of serious potential hazards. The "warning" series was expanded to include aviation topics as well as flight deck safety, maintenance safety, and a wide range of other areas. In addition, blank "warning" sheets were distributed throughout the ship and air wing, where they received instantaneous and enthusiastic acceptance.

It is felt by many that the "warning" sheet would be extremely valuable were it available throughout the Navy. Our squadron has used the "warning" sheets to highlight the potential hazard of plastic butane lighters, to warn flightcrews of newly incorporated airframe changes, to emphasize flightdeck safety, etc.

You can cut out the "warning" label with this article and use a copy machine to make your own "warning" sheets. They can be a vital tool in communicating safety.

Maj Bill Sambito
1st Lt Ben Lafollette
Cpl Jim Barrow

BRAVO ZULU

"YOUR No. 2 engine's on fire!" These words turned a routine troop lift into a near nightmare for Maj Bill Sambito and his crew, 1st Lt Ben Lafollette and Cpl Jim Barrow. At the time of the incident, they were lead aircraft in a flight of two CH-46Ds on a local troop lift mission. Three hours into the mission, Maj Sambito landed his aircraft in a zone to pick up five additional passengers, giving him a total of 19 souls onboard. A particularly hot day made it a high-density altitude condition.

After lifting out of the zone, Maj Sambito headed the aircraft out over the water. Forty-five seconds after take-off, at an altitude of approximately 300 feet AGL and with 70 knots IAS, the crew heard a loud pop. Maj Sambito asked for confirmation of the noise as he instinctively checked his cockpit gages for further indications. Seconds later his wingman reported that his No. 2 engine was on fire. At the same time, he experienced a loss of power and a corresponding decay in rotor RPM. His copilot, 1st Lt Lafollette, activated the emergency throttle system. 1st Lt Lafollette then actuated and discharged the engine fire bottles, but these had little effect upon the fire.

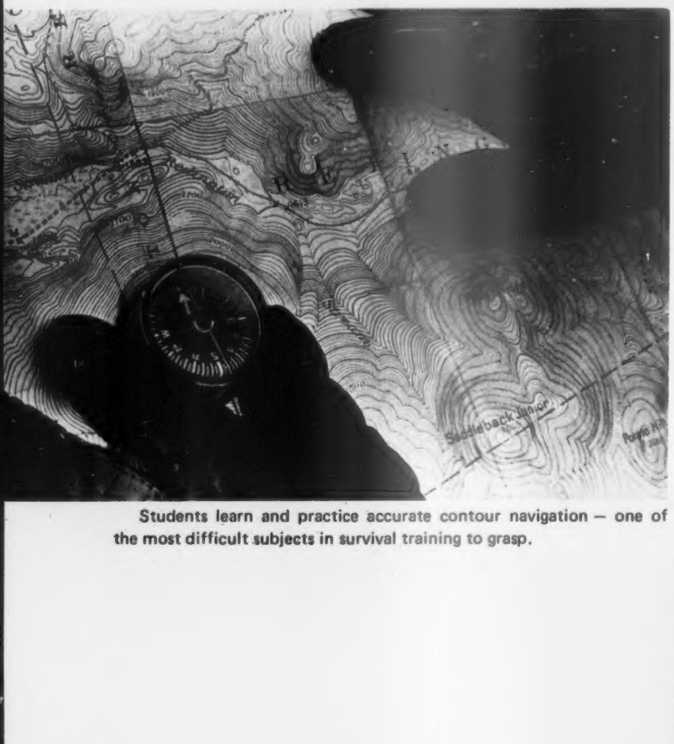
With decaying rotor RPM, continued altitude loss, and an engine on fire, Maj Sambito turned his aircraft towards land in hopes of making a safe landing. The aircraft crossed the shoreline with no suitable landing area available. However, a plateau approximately 45 feet high was located immediately ahead. Maj Sambito flared the aircraft and traded airspeed for altitude. This maneuver gained approximately 50 feet of altitude and bled his airspeed to 40 knots IAS. This allowed him to clear the plateau edge and put him in a position to land. While executing the flare, Maj Sambito reduced his collective and utilized the engine beep trim switches to keep his good engine at a manageable RPM.

Left to right: 1st Lt Lafollette, Cpl Barrow, and Maj Sambito.

As Maj Sambito leveled the aircraft's nose, a clearing came into view. He set the aircraft in an approach attitude and executed a roll-on landing with an airspeed of about 30 knots. The pilot stopped the aircraft in approximately 80 feet and, due to the engine fire which was still burning, executed an immediate shutdown. After rotor shutdown, Cpl Barrow aided the passengers in unstrapping and directed them to exit via the crew door. He then began to fight the fire using the aircraft's CO_2 bottle. The wingman flew to an auxiliary refueling field to pick up additional firefighting equipment. During this interval, Cpl Barrow used an entrenching tool, taken from one of the passengers, to throw dirt into the No. 2 engine exhaust in another attempt to extinguish the fire. The wingman returned in a few moments with two 30-pound CO_2 bottles which were subsequently used to put out the fire.

Throughout the entire evolution, the crew performed their emergency procedures in a flawless manner. A well done to this aircrew for the preservation of 19 lives. It is truly remarkable that the only damage to the aircraft was internal destruction of the No. 2 engine due to the fire.

Cold Weather SURVIVAL



Students learn and practice accurate contour navigation — one of the most difficult subjects in survival training to grasp.


Instructors demonstrate how to make a lean-to shelter. Poles are first placed against a ledge or bluff at an angle. Other poles are then placed on an angle to support the roof. Thick evergreen boughs finally are added for rain and snow runoff and warmth.

SCHOOL

Story and photos by PHC John Francavillo
Atlantic Fleet Audiovisual Command

"OUR students are allowed to come inside when the wind chill index reaches 50° below zero," says CDR R. W. Ritz, Officer-in-Charge of the Fleet Aviation Specialized Operational Training Group in Brunswick, Maine. Founded in 1962 as an offshoot from the standard Navy Survival School, this no-frills 5-day course in cold weather environmental survival training is conducted in a remote 4,000-acre wilderness atop a 2,600-foot mountain near the Canadian border.

Past students have included reservists and active duty military personnel from all the armed forces, Boy Scouts, high school students, hunter safety groups, and members of the Snow Mobilization Association. "Ninety percent of our trainees, however, come from naval aviation," says PH1 Dick Blouin, a seasoned instructor.

All instructors are volunteers. And the road to final certification is filled with hard work and dedication. Most of the instructors are graduates of the prestigious Canadian Land and Sea Survival course in Alberta, Canada. "The major difference in our schools," says HM2 Tom Pollack, "is that we stress two-man shelters while they stress individual shelters."

All instructors must attend a 4-week instructor training course. In addition, before receiving their 9505 NEC, potential instructors must attend the survival school as students. Also, they are given detailed required reading, practical requirements, a written exam, and an interview.

Classroom and field instruction at the Cold Weather Survival School cover the psychological aspects of survival, shelter building, food sources, water procurement, snowshoes, traps and snares, group contour navigation, survival knots, and first aid. "One of the most important things we stress here," says HM2 Pollack, "is first aid." Special emphasis is given to frostbites and hypothermia – the major causes of fatalities in freezing temperatures. Students are taught to use their own body heat as a treatment for the first stages of frostbite, where the skin appears cherry red. When the skin becomes solid and discolored in the more advanced stages,

RM2 Jan Van Dyke prepares to take a drink of water from his canteen cup. Students are taught how to find sources of fresh water, how to purify contaminated water, and the operation of a solar still.

AMHC Tim Russell (right) and HM2 Tom Pollack (center) demonstrate how to tie a sleeping bag onto one's back using parachute cords and specialty knots.

HM2 Tom Pollack illustrates animal snare to students in Cold Weather Survival School at Redington Training Facility, Rangeley, Maine.

With sleeping bags tied to their backs, students begin 1-mile climb up "Heart Attack Hill" as an introduction to the Redington Training Facility at Rangeley, Maine, about 40 miles from the Canadian border.

the affected area must be soaked in warm water. Pollack warns: "If not treated, amputation or even death can result."

The first day of class is held at NAS Brunswick, Maine. Films are shown on general survival; arctic clothing and survival equipment is issued. "We also try to stress the mental attitudes for survival and the importance of group organization and morale," says Blouin.

On Tuesday at 0400 the students are bussed 3 hours away to the Redington Training Facility at Rangeley, Maine – about 40 miles from the Canadian border. In the thicket of evergreens, pines, and birch trees, students immediately shoulder their packs using pieces of canvas and parachute cords. A 1-mile steep climb up "Heart Attack Hill" begins.

At the top of the hill, students are divided into groups for more individualized instruction. A small log cabin with a dirt floor and a wood-burning stove serves as a classroom. "One of the things we try to break is bad habits," says AMS3 Greg Murry, who teaches a course in the proper use of cutting edges. "When using an ax, there's no room for carelessness."

By nightfall, classroom instruction emerges into hands-on training: traps are set, firewood collected, and lean-to shelters

ET3 Mark Hogan (left) and ET2 Chris Piereman collect branches for a fire and twigs for added insulation in their lean-to shelter.

are constructed. Everything from parachutes to birch bark is utilized. "Morale will really get high if someone catches a wild rabbit," says chief petty officer Tim Russell. He was right. This class caught and ate six unsuspecting creatures.

Demonstrations on signal fires, smoke markers and pen flares, shelter building, and food and water survival are part of the third day's itinerary. Students are warned about poisonous mushrooms and taught how to make a meal from edible ones. A warning also goes for plants that have a milky sap, spines, fungi, and spurs. "However," adds Pollack, "the white fungus that grows on many rocks can be pulverized into an edible flour."

Thursday's highlight is a 3-hour hike and exercise in contour navigation. With compass and map in hand, students orient their charts and try to find their exact location. Students are reminded that, in air navigation, position is relative to altitude, airspeed, and wind – and is constantly changing. In ground navigation, position is based on a positive static fix.

By midday Friday, students clean up their sites and return to Brunswick.

"After 14 years in aviation," says Army staff sergeant and Maine outdoorsman Phil Flagg, "I still feel that I've learned a lot here." No matter who you are or where you've been, you're bound to pick up some valuable safety and survival information at the Navy's Cold Weather Survival School. Contact FASOTRAGRULANT Det Brunswick to find out how you and your command can take advantage of this useful, challenging training. LCDR Walter Hodgdon runs all the survival schools and can be reached at Autovon 476-2651.

Army staff sergeant Phil Flagg retrieves rabbit he caught using a simple drag snare made from piano wire. All rabbits caught were skinned, cooked, and eaten.

Anymouse

Here's a story in which not all members of a P-3 crew knew who was the pilot in command; of a flight engineer who felt he was being ignored; and of differences of opinion.

Ignored Recommendations Poor Communications

WHILE taxiing to the runway for takeoff on a night, PPC checkflight, I reported a failure of the No. 4 engine horsepower indicator to the PPC, who was occupying the copilot's seat. The PPC didn't acknowledge, and we continued to taxi. It was immediately noted that the No. 4 engine fuel flow indicator had also failed. This was reported to the PPC without his comment.

The pilot undergoing checkout, in the pilot's seat, recommended that we return to the line for repairs. The PPC still did not acknowledge the problems and the left-seat pilot continued to taxi. He urged the PPC to return to the line, but his recommendation and the failures were ignored.

The starboard aft observer reported an oil leak on No. 4 engine. A check of the oil quantity indicator revealed a fluctuation in the No. 4 engine oil quantity. The checkout pilot stopped the aircraft and I went aft to determine the source and severity of the leak. The No. 4 engine cowling, the starboard wing, and the starboard aft observer's window were covered with oil. I returned to the flight station and secured No. 4 engine with the fuel and ignition switch.

We returned to the line for another aircraft and were assigned one which had just returned from flight. The turnaround inspection was completed and we taxied out again. During taxi, the pilot's utility light failed. I informed the checkout pilot that it was a "down" discrepancy – since it is the pilot's emergency light and is powered by the Flight Essential d.c. Bus. The checkout pilot said we should return for repairs or have the inflight technician attempt to repair it. The PPC finally spoke up, but said that it wasn't a "down" discrepancy and that we would continue. I recommended to the PPC that we repair the light before flying, because it's the pilot's emergency lighting and a "down" discrepancy for safety of flight.

The checkout pilot was unable to read his approach plate, so I held a flashlight for him while he found the appropriate plate. The PPC said the pilot's utility light had nothing to do with safety of flight. When we reached the end of the duty runway, the checkout pilot set the parking brake, moved his seat aft, and the flight technician replaced the bulb. It

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

worked, and caused only a 3-minute delay.

Almost immediately after takeoff, we entered icing conditions. The engine anti-ice and propeller anti-ice/de-ice systems were turned on and worked as advertised. After reaching "on-station," icing worsened, and it was necessary to use the wing and tail de-ice system. Ice build-up on the cockpit windows made it necessary to use "high" windshield heat. We flew for about 3 hours, until the prop spinner anti-ice system malfunctioned. Number 1 and 4 amperage were normal, but No. 2 and No. 3 went to zero. This failure was immediately reported and, like previous reports, went without comment by the PPC as we continued the flight.

I checked the circuit breakers, cycled them, and rechecked the system without any change. We flew for another couple of hours and then headed for Homeplate. A short time later, we made an uneventful landing. Postflight inspection revealed about 1 inch of ice on the nose radome and searchlight dome. Fortunately, there was no ice on any of the props or spinners.

I realize that it is necessary to play little games on PPC checkflights, but I feel that they may go too far at times before the PPC explains his intentions to the flight engineer. Better communication between the PPC and the flight engineer would certainly make this type of flight safer.

Alongfortheridemouse

Communicate

TOO many of our pilots have been neglecting to call on squadron frequency, after landing, and have been taxiing to one of our parking spots with no lineman.

This practice, to say the least, is hazardous to the parked aircraft and to our people working on the line. I know the taxiing pilots have no way of telling if the parked aircraft are on the proper spot. I also know the taxiing pilot cannot judge his wingtip clearances with enough accuracy to ensure safe passage.

There is no explanation for the way this began. I do know it's happening more frequently. I feel it's a simple thing for a pilot to pick up a mike and announce he's on deck and taxiing in. Maintenance tells us and we go out to park the aircraft.

I wonder why Ops doesn't give a hold to all taxiing aircraft until we can get out there? If the pilots were forced to hold on the taxiway before entering the parking ramp they'd call us to avoid delays.

Linemouse

Trick Deck

THIS happened to a member of our squadron on the USS REVOLUTION. An AT troubleshooter was walking back from the fantail, on the flight deck, during a night launch. He headed for the starboard deck edge, just aft of the island, by cutting across elevator No. 4. As he proceeded to step onto the elevator, the horn sounded and, almost simultaneously, the elevator was lowered. The momentum of his stride carried him onto the elevator, which had already dropped below the deck. He rode it down with his heart in his throat. The stanchions had been left down because an aircraft was too close to them. There was only one yellow shirt around besides the elevator operator. No one warned the potential victim. There were no personnel to hold a safety line around the border of the elevator, as required by CV NATOPS. Yes, it was night, and the troubleshooter should have been more alert. Had he walked into the area 5 or 10 seconds later, without hearing the horn, the ending to this ANYMOUSE would probably be a lot different. The handler and ship's safety officer were told of this near-miss.

Concernedmouse

We'd like to commend Concernedmouse for reporting this incident to his safety officer, as well as submitting this ANYMOUSE. This clearly marks him as an individual truly concerned with improving safety, and not simply a disgruntled sailor with a personal complaint to air.

Re: "Why Safety Officers Turn Gray"

I DISAGREE with the title of the original article and think it should be, "Stop the Parade, I'd Like to Get Out." I have a solution that has worked for me in the past in the same situation. It is my opinion that no one can stop a CO from forcing almost any aircraft in any form to be manned, but here are two techniques I have seen used that will keep a down aircraft on the ground. First, maintenance personnel (preferably the MO or MMCO) must require the CO himself to sign the safe-for-flight release. The requirement for his signature on the dotted line is generally good enough to wake him up and has worked for me twice in the past. If this fails, the pilot must then man the aircraft and down it.

It is a complete mystery to me why anyone in peacetime would propose manning, let alone flying, a down aircraft. It is a problem that a safety officer can help with, but to whom does the safety officer give advice? Ultimately, it is only the pilot-in-command who can say, "Enough is enough; I will not accept this aircraft." It is this pilot who does himself, his CO, his crew, and the Navy the greatest service.

Maintenancecontrolmouse

New SH-3 flotation collar

By LT Mike Callinan
HS-1

FRAMP instructor AME2 Marlin Parker and NARF Pensacola engineer Mike Baumgardner examine the flotation collar during a practice hookup in the hangar.

Utilizing a public works crane, the test aircraft is lowered into the St. Johns River. Note that the onboard flotation bags were previously deployed.

WITH the ever-increasing cost of replacement aircraft and material, the need to ensure the effective utilization of our present assets is obvious. In regard to the SH-3 aircraft, evidence suggested that after most unscheduled water landings insufficient time was available to effect successful recovery of the aircraft prior to its capsizing/ sinking. Therefore, a method of keeping the aircraft afloat for an extended period was desirable. With this thought in mind, NAVAIRSYSCOM authorized the development of emergency flotation collars for use with SH-3 aircraft that had made water landings and were in imminent danger of sinking.

The task of testing the prototype collar fell to the *Sea Horses* of HS-1 at NAS Jacksonville. Preparing a test aircraft and coordinating the logistics of the test were the responsibility of the Maintenance Control Officer, ENS Ken Sellers, and involved personnel from virtually every work center in the *Sea Horses'* Maintenance, FRAMP, and SAR school departments.

After successful completion of the test, the prototype, along with several suggestions for improvements, was sent back to the B. F. Goodrich Company for evaluation/implementation.

The flotation collar is now in service and the first two units have been delivered to HS-1 and HS-10. The accompanying photographs illustrate the use of the new SH-3 emergency flotation collar.

HS-1 SAR School personnel AE2 Stanley Reed and AW2 Kenneth Todd, together with NATOPS Aircrew Evaluator ADC Gerald Parks and AMSAN Alfred Stiefel, prepare to deploy the flotation collar.

With the flotation collar attached to the aircraft, the signal to pull the inflation pins is given.

With the flotation collar fully inflated, tension is released on the crane and the aircraft floats fully supported by the collar.

Okay, Doc, Now what?!

By CDR V. M. Voge
Naval Safety Center

WELL, this is it! The seventh and final article in our series about disorientation and vertigo. In this article, we hope to instill in you some of the basic skills (requirements) to enable you to "beat" the *seat of your pants*! Of course, if you're going to understand what's up and coming, it might be a good idea for you to go back and read the preceding six articles. Remember, if you don't have them available, that's no excuse! Just write to us here at APPROACH, and we'll gladly get copies sent out to you and yours!

Since this series has been drawn out over a period of 8 long months, we'll recapitulate our definitions of vertigo and disorientation. As you may or may not remember from recent ancient history, **vertigo is not disorientation**!! It may seem to be a question of semantics to you, but they are as different as

night and day. The only real similarity is their mutual ability to mess up your mind and to help you buy choice real estate (that 6-foot farm). We certainly hope you're not in the market!

Vertigo, in the pure sense, has to do with the tricks our inner ears (vestibular systems) can play on us. Most manifestations of vertigo occur when we change our attitude slowly in one direction and then counter this by a rapid movement in the opposite direction, or vice versa. The key to the situation is that the inner ear becomes confused and lies to us about the location of the real vertical. We are especially prone to develop vertigo when flying without a horizon, in IMC, or on a black night. We have nothing on which to fixate our eyes to enable them to *tell the truth*. As you well remember, examples of vertigo are: *coriolis effect*, the *leans*, the *graveyard spin*, the *graveyard spiral*, and the *oculogyral, oculogravic, somatogravic, oculoagravic*, and *elevator* illusions. We either have to rely on the *seat of our pants* in these cases (an extremely unhealthy situation), or get on and believe those instruments. That's it, guys and gals – plain and simple. The cure for vertigo, in most cases, is a one-shot procedure (just like penicillin). The odds that your instruments are lying to you in comparison to the odds that your *senses* are lying to you are about 1×10^6 to 1! Other good tips: try not to make head movements when the aircraft is in a spin or sharp turn, especially when IFR; don't lean over to pick up equipment or to adjust controls when in a turn; make all aircraft attitude corrections 100 percent on instruments; and last and most important of all, swallow that superjock image and admit to yourself, and to others, that you have vertigo!

Spatial disorientation usually has to do with the tricks our eyes can play on us, or our eyes in conjunction with other sense organs. As you remember, examples of this phenomenon are: *target fascination, the breakoff phenomenon,* the *autokinetic phenomenon* (visual autokinesis), *flicker vertigo, circularvection* and *linearvection, approach and landing disorientation, misplacement of the horizon, space myopia,* and *problems with polaroid sunglasses.*

Most of these have to do with what we call visual misperception in conjunction with mind set. The combinations are specifically evident in *target fascination* and *flicker vertigo*, where our eyes perceive something (a prized target, or the "off" and "on" light stimuli) and our minds do the rest simply by focusing on what the eyes are telling them. In the various cases of disorientation, the remedies are more diverse than they are for vertigo, but we always start from the same ground zero – **recognize the problem**! If you can't recognize the enemy and realize that "he is us," the battle is soon lost. Get the point?! Another point – get on those instruments and believe those instruments!

Many cases of disorientation can be cured by diverting your attention from your primary point of reference simply to gain another perspective, e.g., divert eyes away from the runway or away from the target (momentarily), find yourself a horizon (not that sloping cloud bank out there!), don't fixate, and keep that scan going with a well disciplined cross-check procedure. Some pilots have found that they can come back to the *real world* by performing some simple maneuvers with accuracy, by a rehearsal of cockpit checks, or even by wiggling in the seat and adjusting the straps or by shaking the head. (Caution: Don't shake your head while in angular motion (e.g., a turn) or you may be plagued with vertigo!)

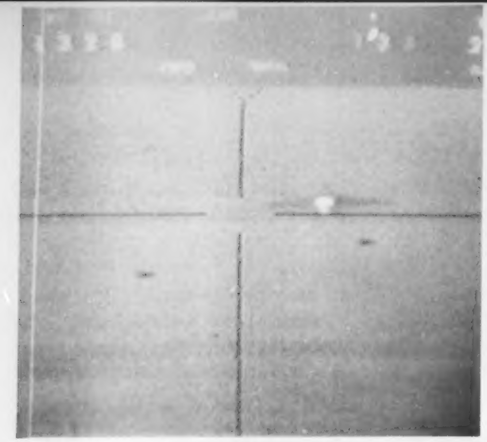
By the way, remember that there can be various combinations of types of vertigo and types of disorientation at one time to contend with! Both abrupt and smooth maneuvers can cause problems. Flying on partial instruments can increase your anxiety state to the point that you are more prone to vertigo/disorientation – remember that! Also, avoid distractions while flying. These can also make you more subject to disorientation/vertigo.

Those are the specifics. But what about the generalities?! Why does LTJG D. S. Slo seemingly get disoriented/vertigo much more frequently than good ol' LT B. Z. Superjock? There could be many reasons for this. Training and experience are definitely factors. It even goes as far as innate personal susceptibilities to fall for the tricks one's mind/eyes/inner ears play on one. But that isn't a good excuse. You can defend yourself from vertigo/disorientation not only by being aware of the general coping mechanisms described above but also by keeping that *ol' bod* in good shape. We don't expect you all to be superjocks, but we certainly do expect you to **keep physically fit** (that is official CNO policy, by the way); **eat frequently** (three times a day, that is); **get enough rest**, both as related to sleep and circadian rhythm problems (circadian rhythm will be discussed in a future APPROACH article); **don't overindulge in food, booze, or medications** of any sort; and **stay away from tonic water, lemon sour, or anything else that contains quinine** (see NOV '79 APPROACH article). (We assume none of you will fly when physically ill, so we won't mention it!)

It is generally accepted by those "in the know" that poor physical condition, poor nutrition, fatigue, circadian rhythm problems, alcohol, hangover, drugs, and now quinine make it much easier for you to become disoriented. That's not just me, your friendly flight surgeon talking, but the experts in the aeromedical field. Don't try to deceive yourself. Sure, you may be able to "hack it" a couple of times, but sooner or later it will come back to bite you! Familiarity breeds contempt, and too much success at hacking disorientation/vertigo, if you're so lucky, will sooner or later win you the *Delta Sierra Trophy.*

For your information, the general factors that have been implicated with disorientation/vertigo as related to aircraft mishaps are, in descending order: visibility restriction (weather, haze, darkness); limited total experience; delay in taking necessary action; failure to use accepted procedures; selected wrong course of action; misjudged speed or distance; channelized attention; distraction; violation of flight discipline; poor crew coordination; fatigue; and panic.

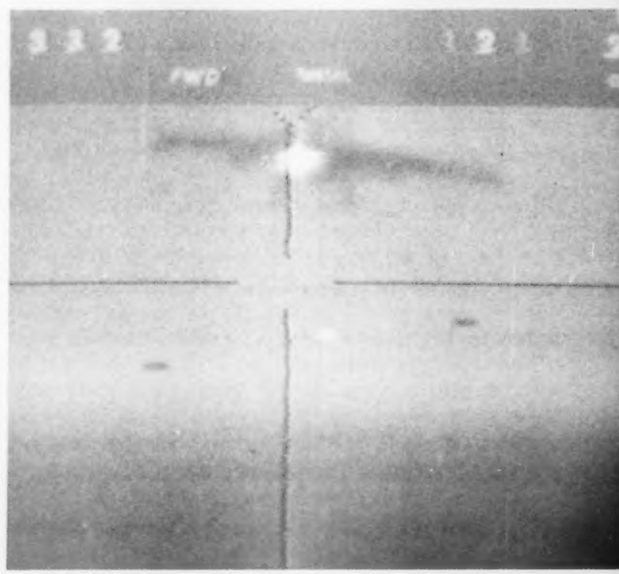
Enough said?!

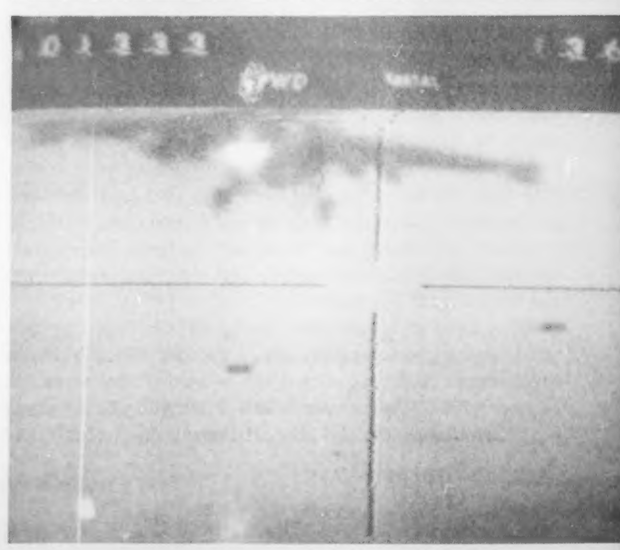


PADDLES CONTACT

"You're looking good,

By LCDR Robert J. Logan
VA-85





HOW many times during a low-visibility CV approach have these reassuring words enabled you to continue your approach to a successful landing? A recent A-6 landing incident illustrates that even the most experienced team of LSOs is not infallible in controlling an aircraft to touchdown. The following narrative is offered to provoke readyroom discussion and provide insight into the decisionmaking process when you, too, inevitably face a similar set of circumstances.

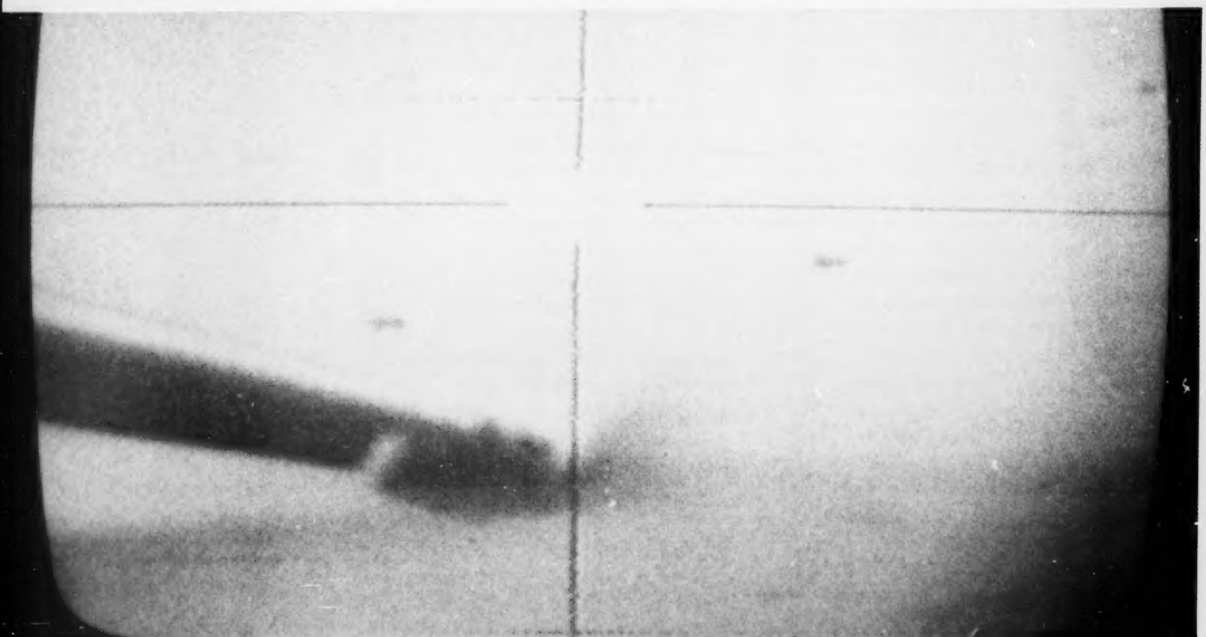
Event One was an early-morning launch into Case III weather, but the weather was above minimums (2000 feet and 2 miles) at launch. The flightcrews were at peak proficiency, having *salted* away the rigors of type training, ORE, and over 4 months of the current deployment. The air wing was also current in that this was the seventh day of an 8-day at-sea period. The decision to launch was sound, based upon existing and forecast weather. Start, taxi, and launch went in accordance with SOP, and VFR on top was finally achieved at 32,000 feet. Tanking evolutions were conducted in the many VFR holes in the existing weather. The first cycle was short (1 hour), but when the CV turned into the wind to launch Event Two, a number of rain showers were lined up neatly along course. (Never fails, does it?) The decreasing visibility resulted in a delayed recovery and the subsequent bingo of a low-state F-4J. The KA-6D could not catch the F-4 on its bingo profile and was directed to return to the CV and enter Marshal since all Event Two aircraft were being recalled.

The weather had now deteriorated to about 400 feet and ½-mile visibility in rain showers. The first four aircraft down the chute boltered. In Marshal, the crew of the KA-6D sensed that the recovery was not going well as they were given DELTA 6, DELTA 4, DELTA 4 . . . a total of 20 minutes delay in their expected approach time. They were going to be near bingo fuel on the ball.

Finally, the time arrived to commence the penetration and the discouraging words came from CCA, "Radar control lost, fly your TACAN." The penetration was completed to level-off at 1,200 feet, 12 nm astern, and radar lock-on was reestablished at 5 miles. (It is interesting to note that ACLS Mode I cannot be used when the deck is pitching, and Mode II cannot maintain radar lock-on during moderate to heavy rain.) A Mode III CCA was provided to about 1 mile when "paddles contact" was made via the taxi light. A transcript of the conversation between the LSO and the KA-6D follows:

d; keep it coming.”

LSO (Touchdown minus 38 sec.): Paddles contact. You're looking good; you're a little bit high.
KA-6D: Roger.
LSO (Touchdown minus 33 sec.): Just a little bit high; be real smooth with it.
KA-6D: Roger.
LSO (Touchdown minus 28 sec.): Let me know when you can see your lineup there.
KA-6D: (No response.)
LSO (Touchdown minus 25 sec.): You're looking pretty good right there for glide slope and glidepath.
KA-6D (Touchdown minus 20 sec.): 523's got a ball, bingo.
LSO (Touchdown minus 18 sec.): Roger ball; deck's pretty steady. A little right for lineup.
LSO (Touchdown minus 14 sec.): A little power; wind is a little starboard. Keep it going right.
LSO (Touchdown minus 9 sec.): Deck's down a little bit. Keep the power up.
LSO (Touchdown minus 6 sec.): Little power there.
LSO (Touchdown minus 4 sec.): Okay, easy with it. [Deck is up; pilot adds power and initiates left-wing-down correction as



nose of aircraft passes left to right through centerline (extended). Pilot holds continuous left-wing-down attitude for final 3 seconds prior to touchdown.]

LSO comments (Bolter): Drop nose in middle. Too much power on lineup in-close. High drift right at ramp.

The pilot could visualize the landing environment (meatball, datum lights, and drop lights) but had almost no lineup cues until he was at the ramp. Lack of a visible horizon required that the pilot continually cross-check his instruments. Lack of rain removal on the right side of the A-6 windscreen completely eliminated any of the lineup assistance normally provided by the B/N. About 4 seconds prior to touchdown, the pilot recognized that he was headed for the "six pack" adjacent to the island and initiated a substantial left-wing-down correction. The aircraft continued to drift right, however, despite being far enough left-wing-down for the left speedbrake to touch the deck. The aircraft landed 27 feet right of centerline, just past the No. 4 wire. On the bolter, the aircraft's right wing tip struck three parked aircraft, separating the speedbrake and 4 feet of leading edge slat. A relatively uneventful climbout and divert followed.

The lesson to be learned from this carrier landing incident is that even the most experienced LSO cannot perceive a high-drift condition at the *in-close* to *at-the-ramp* position. The LSO is concentrating his scan on altitude and power requirements to ensure the aircraft clears the ramp and/or avoids a hard landing. In this instance, the pilot depended on LSO advisory calls at a point when the LSO could not perceive the developing ***extremis*** situation.

During pilot interviews following the incident, it was discovered that most pilots (particularly the more junior) would continue low-visibility CCA approaches well below minimums and even touch down as long as the LSO was providing reassuring advisory calls. The important point to note, however, **is that the pilot must decide before reaching the last safe waveoff point that he has all of the visual cues necessary to effect a safe landing on his own.** The LSO cannot provide the necessary lineup cues *in-close* to ensure a safe landing. This fact is becoming painfully evident as more large wingspan aircraft are touching down and rolling out beyond the foul line. Tailhookers, beware! The decision may face *you.*

Quick feet and a cool head

Maj Jim Cranford had completed an advanced tactics sortie and was returning to MCAS Cherry Point in his AV-8A. A normal VFR entry and break to Runway 32 was performed. During the decelerating transition for a vertical landing on the north pad, at approximately 200 feet AGL and 100 knots, Maj Cranford felt a binding in the right rudder pedal. He applied additional pressure, trying to release the right rudder pedal. Almost immediately, the rudder pedal gave way and then jammed at full right depression. The aircraft started to yaw and roll to the right. Maj Cranford complied with NATOPS by immediately applying full left aileron, full power, and control stick forward to reduce angle-of-attack, thereby keeping the aircraft in controllable flight. Maj Cranford once again kicked the right rudder pedal. After the second kick, a silver cylindrical object was knocked clear of the rudder pedal and landed on top of his flight boot. While holding the stick full left and forward, Maj Cranford pushed the cylinder clear of the rudder pedal with his right hand and made an uneventful vertical landing. Postflight inspection by squadron maintenance personnel revealed that the clip for the center windscreen desiccant container assembly had failed, causing the container to fall and bind the right rudder pedal.

By his professional handling of an *extremis* emergency (i.e., decelerating transition at low altitude and low airspeed), Maj Cranford turned a potentially disastrous situation into a safe recovery. His sound judgment and airmanship were readily apparent. A hearty "well done" for this professional aviator.

Noncompliance with NATOPS procedures has caused us to lose aircraft in similar instances in the past. The incident above should reinforce the need for thorough knowledge of NATOPS and correct application of procedures in an area of flight where room for "second thoughts" does not exist. — Ed.

When do you get out, anyway?

By LCDR R. J. Waterman
VAQ-133

AS of 30 June 1980, fatalities in naval aviation are double what they were last year. The number of fatalities in ejection-seat aircraft raises many questions, not the least of which is: Why are these crewmen not ejecting? The causes or errors leading to the mishaps are important, of course, and need to be addressed, but that is not the topic under consideration here. The question, once again, is: Why, once the loss of the aircraft was inevitable, did the aircrews remain in the cockpit? And, in particular, why are crewmen with no controls remaining?

Reviewing my own knowledge and situation as an NFO in a multiseat aircraft with command ejection, I found that I and obviously many others were depending upon pilots to initiate ejections during the most critical phases of flight, e.g., launches, recoveries, low levels, and in FCLP patterns. I had assumed that the intensive training that pilots have undergone leaves them acutely aware of when they are in control and when gravity has taken over. The error of this reliance has been driven home by the statements, "Witnesses saw no ejection attempts" and "No beepers were heard on Guard." Pilots have been misjudging the recovery envelope, the limits of which I was only vaguely aware.

In examining my own perceptions of aircraft and pilot limitations, I found I was not cognizant of the exact airspeed, attitudes, and altitudes from which recovery was routine, marginal, or impossible. In our crew briefs, we were covering emergencies and proper responses – "Insufficient end speed off the catapult – command ejection through the canopy." The factor we weren't discussing was the exact definition of insufficient end speed. I was looking for a proper flying speed, but I didn't know the exact point at which the airspeed was too low for any chance of recovery. One hundred forty-five KIAS was plenty, 120 was automatic ejection . . . 140 was sufficient . . . 130 called for the jettison of stores and ejection, if the VSI indicated continued descent. What about 125, 123, or 127 KIAS? The line between "recovery possible," if handled correctly and expeditiously, and "recovery not possible," no matter how fine the aviator's reflexes, was not clear to me. Even less clear were the intentions of the pilots on whom I was depending. We hadn't been briefing the exact flight characteristics that he considered salvageable and which characteristics/situations called for command ejection.

In a manner of speaking, in the phases of flight where survival by ejection was dependent upon immediate reactions, I was just along for the ride. For other NFOs who may be blissfully ignorant of their aircraft's limitations or their pilots' intentions, I suggest a revision of plans and procedures along the following guidelines:

NATOPS. Study the ejection envelopes for various altitudes, adverse attitudes, sink rates, and dive angles. (Remember these curves do not include reaction time.) For instance, safe ejection altitude rapidly increases with bank angle even with a zero feet per minute sink rate. These increases are not linear, however. The safe ejection altitudes for the Martin-Baker GRU-7 seat with no sink rate are: straight and level – 0 feet; 45 degrees of bank – 300 feet; 90 degrees – 430 feet; 135 degrees – 530 feet; and inverted – 580 feet. The first 45 degrees of roll add 300 feet, but the last 45 degrees add only 50 feet. If your aircraft is laterally unstable approaching stall speeds, any control movements causing roll, however slight, may put you outside the safe ejection envelope almost instantaneously. The exact moment that control is lost is difficult for pilots to determine and almost impossible for NFOs to determine. He who hesitates . . . .

How about if the nose pitches down after a cat shot? Check the charts for the altitude necessary for safe ejection at normal launch speed with just a 10-degree nosedown attitude. You'll probably find that, if it has reached 10 degrees nosedown, you might as well stay in.

Learn the stall speeds for critical phases of flight – not rough approximations, but speeds as exact as can be determined from the charts. Since bank or dive angles are instant jeopardy, the flight envelope limits must be known for launches and approaches. Angle-of-attack is easy and convenient, but be able to determine your fate if it's not available.

Briefs. For aircraft with command ejection, NFOs must learn the exact situations in which their pilots intend to eject. If your seat ejects at an angle rather than vertical (EA-6B for example), you would probably not want him punching you directly into the carrier island. If your aircraft's nose has already rolled off the flight deck, will you ride the plane in or go skipping across the water like a flat rock? Discuss the conditions under which you will eject on deck. It's bad luck to unstrap for emergency egress only to be shot 200 feet in the air (it has happened). Knowing your driver's intentions is especially important on those first few hops together.

How about debriefing those hops where nonbriefed maneuvers have occurred? The pilot drops down to 100 feet for a *one-man airshow.* Are you comfortable? Do you raise hell during the flight or during the debrief? If the crew hasn't briefed those maneuvers prior to the hop, how do you know for sure the pilot is still in control? Don't sacrifice numero uno on an assumption.

Bull sessions. Lastly, and in the same vein as briefs, are general, there-I-was sea stories. Use those heavies with thousands of hours and hundreds of traps. Endure the boredom and sift out the important factors from each tale. Their experiences can provide you a solid base for formulating your own ejection criteria. But no matter how you originate them, **know** your capabilities and limitations before manup. They are too important for spur-of-the-moment development.

Fine Tuning maximum range performance

By CDR C. J. Winters
VT-28

IN these days of ever-increasing fuel costs, fuel efficient aircraft operations afford the opportunity for ever-increasing savings. One area that can pay dividends without adversely impacting operations or training is improved range performance, particularly for cross-country flying. Most pilots during their training were exposed to a POWER vs. TRUE AIRSPEED (TAS) chart for prop aircraft and a THRUST vs. TAS chart for jet aircraft. Those with good memories will remember the aerodynamics instructor pointing out that maximum specific range (most miles per pound of fuel) occurs at the point on the chart where a line drawn from the origin is tangent to the POWER vs. TAS curve (THRUST vs. TAS for a jet). All naval aircraft are furnished with charts, tables, or some means of determining maximum range. The power setting and resulting airspeed may not be the optimum, however, for a number of reasons, including:

- Range tables for aircraft generally list power and airspeed settings for increments of aircraft weight. Optimum maximum range, of course, will occur at only one weight in the increment, and then its accuracy is dependent upon the accuracy of the aircraft weight estimate.
- It is common U.S. design practice to define long range cruise as the power setting which provides 99 percent of absolute maximum specific range. The advantage of such operation is that 1 percent of range is traded for 3 to 5 percent higher cruise velocity.[1]
- Range charts, generally, are for no wind conditions.

As an example, the T-44 multiengine trainer NATOPS lists only one power setting, 650 pounds torque, for maximum range performance. Although this power setting is a representative value for most flight conditions, it can produce the absolute maximum range performance at only one combination of aircraft weight and wind. Less than maximum range performance will occur at all other times.

The first two reasons given above for less than optimum range performance are of interest, but for most aircraft are of lesser importance. The effect of wind on range, however, is of considerable importance to all aircraft. As an example of an extreme condition, consider an airplane flying into a headwind which equals the aircraft's NO WIND maximum range TAS;

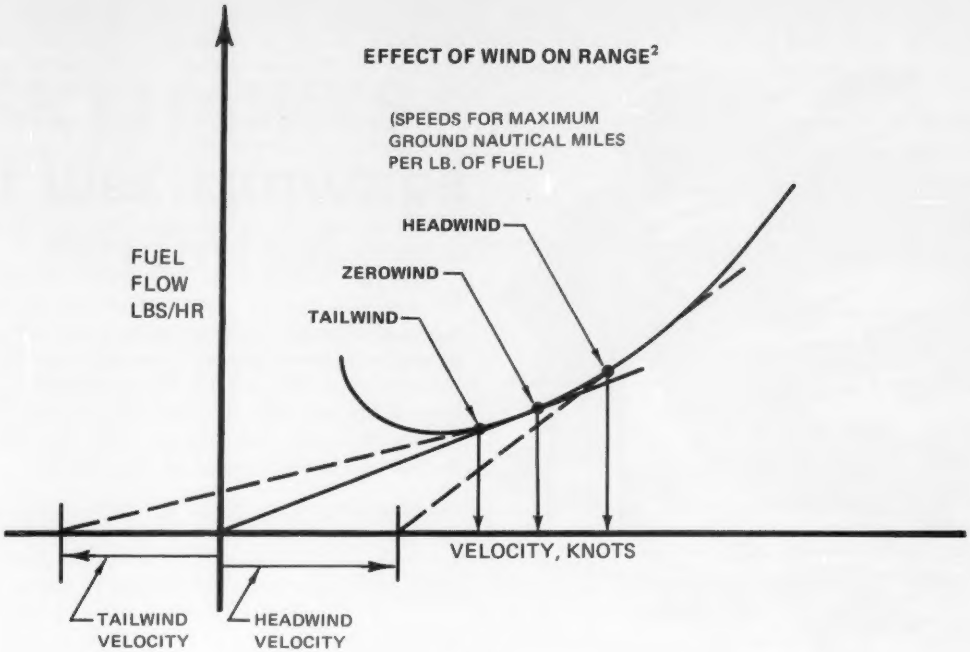


Fig. 1

the airplane will remain over a fixed position on the ground. In this case, any increase in aircraft speed will improve range. Figure 1 illustrates a typical curve of FUEL FLOW vs. TAS. Fuel flow can be substituted for power since it is directly related for propeller aircraft (just as fuel flow and thrust are related for a pure jet). Maximum no wind range occurs where the ratio of TAS over fuel flow is greatest, and this point is located by a straight line from the origin (zero velocity) tangent to the curve. When a headwind exists, the speed for maximum range is located by a line drawn from a velocity offset by an amount equal to the headwind velocity tangent to the TAS curve (see Fig. 1). This will locate the maximum range at a higher TAS and fuel flow. Of course, range will be less for a headwind, but the increased TAS and fuel flow will minimize the range loss. In a similar manner, a tailwind will reduce TAS required to fly absolute optimum maximum range conditions.

Fortunately, improvements in aircraft equipment make it possible to determine absolute maximum specific range in flight at any time without constant referral to charts. The equipment required is a readout of instantaneous groundspeed, accurate fuel flow, and an autopilot with dependable altitude and heading hold capabilities. The method used is based on the fundamental definition of maximum specific range – maximum miles per pound of fuel. To determine what the specific range of the aircraft is at any instant, simply divide groundspeed by fuel flow. A look at the equation reveals the result is miles per pound of fuel.

$$\frac{\text{groundspeed}}{\text{fuel flow}} = \frac{\text{miles/hour}}{\text{pounds/hour}} = \frac{\text{miles}}{\text{pound}}$$

By starting out at some estimated maximum range power setting and investigating other power settings near the estimated value, it will soon become apparent which power setting produces maximum specific range. The following example illustrates maximum range determination for a T-44 flying with a tailwind.

torque	groundspeed / fuel flow	miles / pound fuel
800	$\frac{243}{390}$	$\frac{0.623}{1}$
700	$\frac{225}{340}$	$\frac{0.662}{1}$
600	$\frac{212}{300}$	$\frac{0.707}{1}$

Continued

Note that the most efficient power setting, 600 pounds torque, gives the most miles per pound of fuel and is at a torque setting less than the no-wind book value of 650 pounds torque.

Similarly, flying into a headwind with a P-3 produced the following results:

shaft horsepower	groundspeed / fuel flow	miles / pound fuel
1925	235/4000	.0588/1
2080	249/4200	.0593/1
2210	259/4600	.0563/1

According to this example, 2080 shaft horsepower is the optimum power setting for maximum range.

Fine tuning maximum range performance by ratio calculations should be recognized as just that. The aircraft must be on the same heading and altitude for all readings since small changes in wind angle will affect the groundspeed. When changing from one power setting to another, readings for calculation purposes should not be taken until after groundspeed has stabilized. Because of the above reasons it can be seen that this method is best suited for long distance point-to-point flying on individual flight legs of 20 minutes or more in length.

This basic method, however, will allow determination of the maximum absolute range performance for any aircraft regardless of weight, configuration, or wind conditions. It can be used to confirm or fine tune maximum range power settings obtained by another method. Flying at optimum maximum range is the only way to cover long distances if you want to save fuel, reduce the cost per hour, and arrive at your destination with the maximum possible reserve.

[1] *H. H. Hurt, Jr., Aerodynamics for Naval Aviators. NAVAIR 00-80T-80, p. 160.*

[2] *Ibid, p. 169.*

Birds or Aviators

EACH year the autumn migration of waterfowl makes hunters and tax collectors happy, but a few pilots very sad. A 25-pound sandhill crane does not belong in a cockpit, engine, or anywhere near an aircraft. However, each year, several close and actual encounters make true believers out of both the cranes and the flightcrews. It's an absolute fact that very few migratory birds study NATOPS or hold extensive preflight briefings. On the other hand, the smart aviator not only knows the migratory routes, but plans the route and altitude to minimize the possibility of a birdstrike. Results of the next few months, as the birds head south (and again north in the spring), should clearly show who is smarter – birds or aviators!

CNAL ASO

SKYHAWKS and wet runways revisited

By CDR C. N. Sapp, Jr.
NARF Pensacola

The Scene:

ANY old A-4 squadron readyroom (not as hard to find as one would think). The weather in the local area was frightful, the wind gusting to prohibitive. The local chapter of Hangar Flyers Anonymous had gathered to spread bilge in the minds of the attentive and admiring fledgling tigers.

The ops boss had just finished the 123rd unabridged version of his single-handed defeat of an entire fighter squadron while flying an A-4C with a full buddy store. Not to be topped by such wall-worn graffiti, LT Red Hott, the local pylon turn expert, began relating an experience that happened to a *friend* of his in another squadron while attempting to land his A-4 at night on a wet runway with a quartering tailwind. With appropriate expletives and arm flails, he described the resultant loss of control, 180-degree turn, and runway departure experienced by his hapless and heretofore unidentified "friend." The convivial spirit of the occasion was suddenly deflated by a voice from the back of the room. ENS Sharp, fresh from the Training Command, asked why LT Hott's friend failed to make a shortfield arrestment.

The room went silent. LT Hott lowered his poised coffee cup to the table. LCDR Fixitlater, maintenance officer and combat veteran of many wars (the boys call him "Patches"), sucked in his breath. All eyes turned and glared penetratingly at the ensign. Electric tension pervaded every corner of the readyroom; pulses raced and blood pressures rose.

The ops boss took on the appearance of Charlton Heston as Moses chastising the Israelites. His hair greyed, his nostrils flared, storm clouds gathered. Sharp suddenly knew that he had committed a *faux pas*. Ops thundered, "Purge thy mind of such evil and unprofessional drivel, lad! Had thy hook been meant for use ashore, it would have been welded in the down position, and all Navy runways would be 1,000 feet in length and built on giant lazy susans, so that they might always be turned into the wind. Drogue chutes are for fighter pilots, reverse thrust for VP-ers, antiskid for *Corsairs*, and tailhooks for turkeys like you. Son, the "Skyhawkers" can handle it, and don't you forget it!"

In the midst of all the verbal abuse, Sharp knew better. A study of A-4/A-7 wet runway accidents (July '72 through September '73) revealed 10 accidents during the landing phase, six of which belong to "Skyhawkers." Despite the advent of spoilers and drogue chutes, not to mention the accumulation of 20 years of operational experience, the A-4s still continue to leave the runway at other than designated turnoff points. An alternative to this disgraceful, unprofessional, and downright hazardous waste of assets is action well short of reinventing the wheel. All that is necessary is the reemphasis of some old common sense rules and the revamping and modernization of some not so common sense attitudes that still persist.

The hazards associated with wet runway landings are well known. The intent of this article is not to parrot that section of NATOPS but rather to shake the cobwebs from the minds of those who are most often where the action is in aviation safety . . . the pilots.

Preflight weather briefings, en route updates with Metros and flight service stations, terminal weather provided by Approach Control, and plain old "looking out the window" should provide plenty of opportunity for the pilot to avoid surprises upon encountering a wet runway. Even if the rain has stopped and all else fails, initial touchdown should give an indication of the surface conditions, and a waveoff can be

initiated if necessary. *Remember:* arresting gear is expensive to install, cheap to operate. Planes are expensive to buy and more expensive to replace. So, when in doubt, let it hang out . . . the hook, that is!

The rationale of making a normal landing, with the intent of catching the midfield gear should things go wrong, is also less than sound. Of the accidents reviewed, eight made no attempt at arrestment, left the runway *prior* to the midfield gear, or the aircraft was in some attitude (sliding backwards, etc.) which precluded proper engagement. So, the landing phase is where the men are separated from the boys; and the boys, all too often, are separated prematurely from the aircraft. Once the decision has been made to arrest, do it by the book – on speed, landing checklist complete, centered ball, and on centerline. Touch down on the money and leave approach power set until engagement is confirmed. Bolter? Don't take it lightly. Two of the accidents in the study occurred as a result of the pilots electing to remain on deck after a hook skip. So, execute a waveoff after a hook skip, fuel and weather permitting.

The planned shortfield arrestment is a panacea for many ills: gusty winds, water on the runway, low visibility, brake problems, tailwind, drogue chute failure, spoiler failure, and blown tire(s), to mention only a few.

In fact, the shortfield arrestment is such an obvious and effective answer to this problem that, since September 1971, it has been mandatory as a result of the COMLATWING ONE/NAS Cecil Field Wet Runway Recovery Bill, which has been expanded to include A-4s as well as A-7s. And, needless to say, the spirit of the instruction also applies while landing at fields away from home.

The A-4 is still the same honest, simple, and reliable aircraft that it has always been, but it also slides, spins, and blows over on its back when abused. If we expect to truly have "Skyhawks Forever," more thought should be given to their care and feeling. Don't fall into a trap . . . take one instead!

Epilogue:

More than 5 years have passed since this article first appeared in APPROACH. From March 1975 - August 1980, an additional 18 A-4s have been involved in wet runway landing incidents or accidents, the most recent being in June 1980. Damage has ranged from injured pride to aircraft with "strike" damage. Some incidents occurred in heavy rain showers, while others occurred on runways where fair to moderate braking action had been reported. Hydroplaning was experienced at airspeeds as low as 20 knots.

Repeatedly, the bottom line from the accident boards has been that "The incident lends support to considering an arrested landing," yet the slaughter of dwindling assets continues.

Regardless of talk of new aircraft coming down the line, we in the Navy may well expect to see today's *Skyhawks* passing in review to celebrate the arrival of the Twenty-First Century. The rain will fall, the wind will blow, and the coefficient of friction will continue to vary down where the rubber meets the runway. These are all universal constants. So, short of changing nature herself, the solution to the problem still lies in that storage place between the ears of the pilot in command.

Taking an arrested landing on a wet runway should be as natural to an A-4 pilot as adding power in a stall. Hydroplaning is discussed from the earliest days in the training of a naval aviator. But, for the A-4 pilot, it must be elevated to *Public Enemy Number One* status and it must become socially unacceptable to be seen rolling out with a rooster tail behind you.

By definition, an epilogue is the final section – the concluding scene – the end. The only ones who can keep this from becoming merely another chapter in an ongoing saga are you, the operators, the ones who must evaluate the situation, then reach over and push that hook handle down. The ball is in your court.

Routine IFR flight

By LCDR Brian Wiggins

IT'S been a few years since my first flight – can't really remember that one well, but I do remember one of my first flights as an SH-2D/F HAC. I had accumulated a little over 1200 hours total flight time with 200 hours in model, so I felt comfortable in the air, but I was still a bit leery of the H-2 flying machine. My copilot (then LTJG Jerry Hirsch) and I were scheduled for a routine night instrument flight from Imperial Beach to El Toro and return. Brief, preflight, and takeoff into the fantastical world of helicopter instrument flight were normal, and we settled back to watch the sunset as the traditional San Diego springtime fog began its daily run on the beach.

Ahhh . . . nothing like a nice routine IFR night flight to end a perfect day. Our first indication that something was amiss occurred when I noticed that the auxiliary fuel tank compressor pressure light was taking an inordinate amount of time to go out. After a few minutes of monitoring fuel transfer, I determined that there was none. Then the ASE tripped off the line, followed by the distinct odor of electrical fumes in the cockpit. Immediately determining that things weren't exactly going our way, we mutually agreed to notify Departure Control of our problems and abort the flight.

Clearance was received, and after completion of our procedures for fumes in the cockpit, we began our somewhat hasty descent back into the San Diego area.

With darkness upon us and with a false sense of security following the decision to abort, the No. 2 engine promptly responded with a partial power loss. We switched to emergency throttle on that engine and then noticed that our TACAN was going squirrelly. No problem normally, except when you can't tell where you have to go.

Approach Control responded with vectors for a GCA, and when frequencies were switched, our UHF radio decided to take a break. Relax, pal, you're in the H-2 with two – count 'em – **two** UHF radios. We finally established communications with Imperial Beach RADAR and began our IFR GCA. (Hang in there, guys, I'm almost finished.) As we completed our landing checklist, the starboard MLG indicated unsafe – GREAT! Luckily, it was the starboard gear, so the crewman could pin it in a hover. We executed a sort-of-normal landing and secured the aircraft.

There have been and probably will be more harrowing flights than this. There were, however, some lessons that I learned: (1) Multiple, nonrelated emergencies do occur; (2) If you have a problem, make a safe decision and tell someone; and (3) There is no such thing as a routine IFR flight.

SURVIVAL/POSTEJECTION PROCEDURES

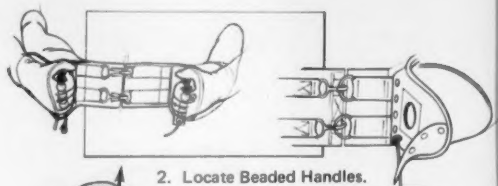
Integrated MA-2 Torso Harness with Rigid Seat Survival Kit – LPA Inflation and Liferaft Deployment Sequence F-4 Configuration

By CDR Jack Greear, MSC
Aviation Physiology Training Unit
NAS Norfolk, VA

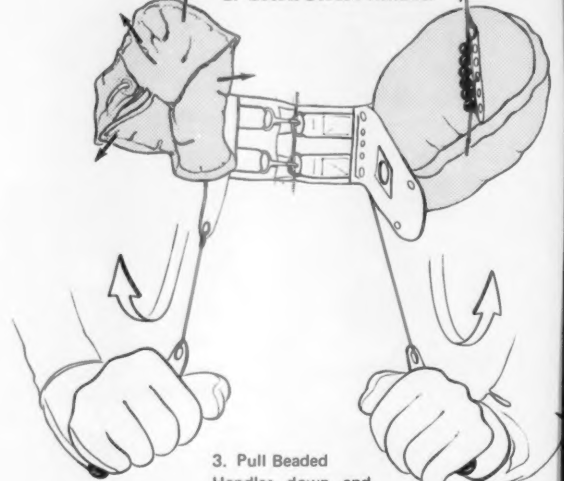
THE following scenario describes step-by-step procedures for inflation of the Life Preserver Assembly (LPA) configured with beaded handles and the 35-gram CO_2 cylinder, and utilizing the RSSK-1/1A. The emergency egress situation is a below barostat, high-altitude ejection (over water) in which seat/man separation and parachute deployment have been accomplished automatically.

These techniques are being published in advance of NAVAIR-00-80T-101 for two important reasons: first, so they will get to the fleet as soon as possible; and second, so that the project manager may receive any possible feedback on these procedures before NAVAIR-00-80T-101 is finally printed. Please forward any comments to: Commanding Officer, Naval Regional Medical Center (Code APTU-230), Portsmouth, VA 23708.

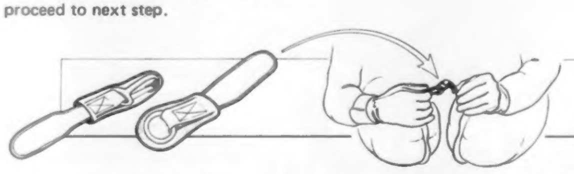
1. Immediately following opening shock of parachute, check the condition of the parachute canopy. If no malfunctions have occurred, proceed to next step.



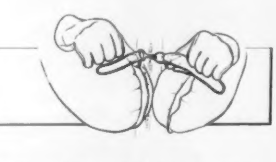
2. Locate Beaded Handles.



3. Pull Beaded Handles down and out to inflate LPA.

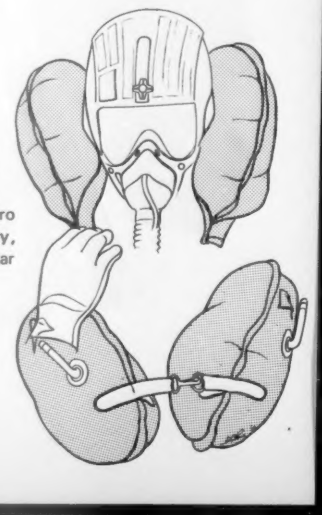


4. Remove chafing material (when required).



5. Snap LPA waist lobes together.

6. Squeeze LPA waist lobes together to help release Velcro on collar lobe, or



6A. Manually release Velcro on collar, if necessary, to achieve complete collar lobe inflation.

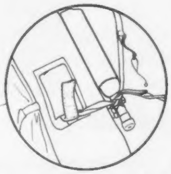
NATOPS Evaluator for F-4 LSE is PR1 Jablonowski, USN.

7. Aircrewman under canopy with LPA inflated preparing to activate kit release handle.

8. With the right hand, locate the raft release handle on the right side of the kit.

9. Pull up and back on the handle until free of the kit. Liferaft inflation will begin when the lower half of the kit has fallen the full length of the dropline.

Pulling the raft release handle unlocks the container; the lower half falls away but remains attached by the dropline.



Raft retention lanyard.

Liferaft fully inflated approximately 17 feet below upper half of seat kit container.

LETTERS
to the editor

Re: "Civilian Flying"

Washington, DC – In regard to the subject article in MAY '80 APPROACH, pg. 31, second paragraph, FAR 61.57 (a) calls for a flight review at least every 24 months. The author used the word "biannual," but should have used "biennial" to indicate every 2 years, not twice a year. Otherwise, a very fine article with many valuable pointers in it.

William M. Fanning
Manager, Technical Service
National Business Aircraft Assoc., Inc.

Questions From an LSO

NAS Miramar – After reading LT Kaul's article "Meatball, Lineup, Angle-of-Attack and . . . Arrow," I came away with a few questions that I would like to present to the author. As an LSO, I am very interested in any improvements that we can make that will reduce aircrew workload and improve the quality and safety of carrier operations. My first concern is how reliable will this system be? Will it have similar problems that we now experience with SPN-41 and SPN-42 gear? Will the inputs to the *arrows* have any allowance for DMC (deck motion compensation) for pitching deck recoveries? My biggest concern relates to MOVLAS. Can we integrate *arrows* and MOVLAS, and if not, will pilots become so conditioned to using *arrows* that it will make it more difficult to use MOVLAS? Another area to consider is what color are the *arrows* going to be?

Personally, it is my firm belief that fleetwide incorporation of Mode I capable aircraft and carriers is the way to go. No matter how much glide slope related data we present on the Fresnel lens, it still depends on human analysis. The computer-controlled, pilot-monitored, automatic approach to arrestment is still the vehicle that will lead us towards 100 percent boarding rates and zero landing accidents.

LT Dan Carroll
VF-124

• LT Charles Kaul's response:

Concerning reliability, the arrow system does not require any active link with the approaching aircraft and would use a passive sensor currently under final development. Improved reliability over the older, active SPN-41 and -42 systems may thus be inferred. However, a failure of the arrows would not affect the validity of the information presented by the FLOLS, and pilots would be instructed to use the meatball for primary reference, as always, with the arrows as additional guidance. Fresnel lens and PLAT camera deck motion compensation is currently scheduled to be available as an add-on change when the new CLASS stabilization system is installed on all carriers. This change would enable heave stabilization with the proposed arrow system as well.

Integration of the arrows and MOVLAS is not anticipated at this time, since the LSO functions as a filter directly in the MOVLAS loop, providing better feedback than the FLOLS when pitching deck conditions are beyond stabilization limits. As for arrow color considerations, a definitive selection has not been made, but a blue-white frequency is being suggested.

Finally, a reliable fleetwide Mode I capability will always be attractive and desirable, but it is likely that, from an operational and tactical standpoint, Mode I operations will always be subject to certain restrictions.

Some Good Advice

FPO, San Francisco – As the squadron safety petty officer for my command, I have noticed that when I distribute our monthly copies of APPROACH, it is accepted as if it were a new copy of *PLAYBOY*. This is very relieving to me because the biggest part of my job is to spread safety awareness throughout the command. This is not an easy job to do. Not because I have the same problem as most safety POs in the Navy, but because my primary job in this squadron is that of a P-3 flight engineer. It seems at times that I spend more time in the air than on the ground, so I don't get around to the workspaces as much as I'd like. When I see people reading safety publications, it tells me that safety awareness is there.

As I mentioned before, I am a flight engineer on a P-3C and would like to share something with other flight engineers. It probably could be applied to other naval aircraft as well.

Back when I was in flight engineer school, a few of us got together one night and started thinking about what a good flight engineer should keep in mind. Everything that we discussed was related in some way to what our instructors had spent 19 weeks beating into our heads – mainly how to keep yourself out of trouble in the air.

Listed below are **THE FIVE BASIC RULES OF THUMB FOR A P-3 FLIGHT ENGINEER**, which I submit to you:

- Never take off with a known malfunction.
- Work with your pilots and keep them informed.
- Make the airplane work for you, not you for it.
- Make every flight a learning experience.
- *NATOPS procedures will work for you, if you use them.*

AD1 William J. Howe
Patrol Squadron 48

• The rules of thumb that Petty Officer Howe proposes are not only fitting for flight engineers, but for every Navy pilot, NFO, and aircrewman.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, VA 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

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